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A Bibliography of the History of Geometry, also a list of Mathematical Periodicals, by Professor R. T. Aley; and, A Note on the Theory of Probability, by Professor G. B. M. Zerr.

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We will send THE AMERICAN MATHEMATICAL MONTHLY one year to any person sending us the names of four new subscribers accompanied with \$8.00.

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### BOOKS AND PERIODICALS.

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*Uniplanar Algebra*, being Part I. of a propædæutic to the Higher Mathematical Analysis. By Irwing Stringham, Ph. D., Professor of Mathematics in the University of California. 8vo, cloth, XIV+146 pp. Price, \$1.25.

"From the beginning, with rare exceptions, a singular logical incompleteness has characterized our text-books in elementary algebra. By tradition algebra early became a mere technical device for turning out practical results, by careless reasoning inaccuracies crept into the explanation of its principles and, through compilers are still perpetuated as current literature. Thus, instead of becoming a classic, like geometry handed down to us from the Greeks, in the form of Euclid's ELEMENTS, algebra has become a collection of processes exemplified and of principles inadequately explained."

The object of this work is the systematic unfolding of algebra into organic forms, and from a careful examination of the book we can testify that the author has accomplished his object.

In the Introduction, the author treats Proportion by the Geometrical Method. Chapter I. is devoted to the treatment of the Laws of Algebraic operations; Chapter II. to Goniometric and Hyperbolic Ratios; Chapter III., to The Algebra of Complex Quantities; Chapter IV., to Cyclometry; Chapter V., to Graphical Transformations; and Chapter VI., to Properties of Polynomials. We highly recommend the work to those who desire to prepare themselves to read, intelligently, the Higher Mathematical Analysis.

B. F. F.

*A Laboratory Manual*. By G. B. M. Zerr, A. M., Principal Stanton Public Schools. Price 60 cents. Stanton, Va.: Caldwell and Holt.

The principal features of this Laboratory Manual are that the tabulated statements are short and yet contain all that is necessary to work intelligently. The matter is such as the author has used with his classes for several years. The book though small contains a thorough course in synthetic chemistry of the non-metals and metals, a thorough course in blow-pipe analysis, and a thorough course in qualitative analysis. All matter that is not practical has been omitted. Teacher of chemistry in the high schools and preparatory schools of the country will find this excellent little work by Professor Zerr well adapted to their needs.

J. M. C.

*Table Book and Test Problems in Mathematics*. By J. K. Ellwood, A. M., Principal of the Colfax School, Pittsburg, Pa. 16 mo, cloth, 288 pp. Price \$1.00, New York: American Book Company, 1892.

Part I. of this book contains a large collection of rules, theorems, formulas, tables of logarithms, sines, tangents, etc., indexed.

Part II. contains about 400 test problems, in Arithmetic, Algebra, Geometry, Trigonometry, all properly arranged and classified. A great variety of fine problems.

Part III. contains solutions corresponding to the problems in the second part. Many of the problems are solved in several ways, so that if one solution is not understood another may be examined. While all the solutions are clear and good, some of them are "gems." The title of this book does not announce all the good things it contains. Every live teacher should have this work on his desk, and every ambitious student of Mathematics should seek its aid.

*Algebraic Analysis.* Solutions and Exercises Illustrating the Fundamental Theorems and the most Important Processes of Pure Algebra. By G. A. Wentworth, A. M., Professor of Mathematics in Phillips Exeter Academy; J. A. McLellan, LL. D., Inspector of Normal Schools, and Conductor of Teachers' Institutes, for Ontario, Canada; and J. C. Glashan, Inspector of Public Schools, Ottawa, Canada. Part I. concluding with Determinants. 8vo, half leather back, x+418 pp. Price, \$1.60. Boston: Ginn & Co.

This work is intended to supply the student of Mathematics with a well filled storehouse of solved examples and unsolved exercises in the application of the fundamental theorems and processes of pure Algebra, and to exhibit to them the highest and most important results of modern algebraic analysis. The book contains the most extensive collection of problems and solutions in algebra that we have yet seen. Fine solutions are given to many of the most difficult problems. The book contains ten chapters. Chapter I. treats of Horner's Division, &c.; Chapter II., Principles of Symmetry, &c.; Chapter III., Factoring; Chapter IV., Measures and Multiples, &c.; Chapter V., Linear Equations of One Unknown Quantity; Chapter VI.: Simultaneous Linear Equations; Chapter VII., Quadratic Equations; Chapter VIII., Indices and Surds. Chapter IX., Cubic and Quartic Equations; Chapter X., Determinants.

The authors promise a second volume which will treat of factorial and combinatory analysis; finite differences and derived functions of single variables; expansions, summation, reversion, transformation and interpolation of series; the arithmetic, harmonic, and geometric series of integral orders including the theta-functions, recurring series; binomial, logarithmic, and exponential series; hyperbolic and circular functions; trigonometric series, direct, indirect, and inverse; Legendre's, Bessel's, Lamé's and Heine's series and their associate functions; &c. &c.

The second volume will be hailed with great joy by the mathematicians in every part of the United States and Canada. B. F. F.

*A Mathematical Solution Book.* By B. F. Finkel, member of the New York Mathematical Society, and Professor of Mathematics in the Kidder Institute. 8vo, cloth, 352 pp. Price, \$2.00. Kidder, Mo.: Kibler, Cokely, & Co., 1893.

In this volume the author has given systematic solutions to many of the most difficult problems contained in the leading text-books on Arithmetic, Algebra, Geometry, Trigonometry, and the Calculus. He has also included many problems with model solutions

This book contains the first attempt to present a systematic treatment of solutions to problems—methods in which the work explains itself—and will prove a great boon to the great body of progressive teachers, who value true training above "short methods," and memorized rules. Great benefit is to be derived by carefully studying solutions of the nature given in this book, and incalculable good will be done in the public schools by following the logical order in presenting solutions to classes.

One of the best features in Prof. Finkel's book is the chapter on Mensuration,

which alone will tell strongly in favor of the book for use among Mathematicians. The etymology of all the principal terms is given, and in order and completeness of treatment the book is most satisfactory. The formulæ for Conic Sections, Higher Plane Curves, Spirals, Cylindric and Conical Ungulas, etc., are the best possible. Under "Solutions to Miscellaneous Problems" many fine exhibitions of mathematical skill are given.

This book is not only valuable and servicable to teachers and Mathematicians, but can be used to a great advantage in the class room—the problems at the end of each chapter affording ample exercise for supplementary work. A personal examination is needed to appreciate all the valuable features of the Solution-Book. J. M. C.

*Miscellaneous Notes and Querries.*

A Monthly Journal of History, Folk Lore, Art, Science, Literature, Masonry, Mysticism, Mathematics, Metaphysics, Theosophy, etc. This magazine contains a large number of the odds and ends in all departments of literature "from many a quaint and curious volume of forgotten lore." Commenced July, 1882. Now in its Twelfth Volume. Each volume fully indexed. \$1.00 a year in advance. Its motto is "Many people know many things, no one everything." Circulates in all parts of the world. Address S. C. & L. M. GOULD, Manchester, N. H.

*Annals of Mathematics*, Ormond Stone, Editor, University of Virginia. Bi-Monthly, \$2.00.

In the November number are articles on "Intermediate Orbits," by G. W. Hill; "Proof of a Formula due to Cauchy," by W. H. Echols; and "Some forms of Lagrange's Interpolation Formula," by W. H. Echols. Five exercises are solved and one new one proposed.

*The Bulletin of the New York Mathematical Society* for December has the following table of contents: "A Doubly-Infinite System of Simple Groups," by Prof. E. Hastings Moor; "Note on Monogenic Functions of a Single Variable," by Prof. Thomas Craig; "Lambert's Non-Euclidean Geometry," by Prof. Geo. B. Halsted; "The Teaching of Mathematics at Gottingen; "Notes"; and "New Publications."

It is to be regretted that neither Dr. Martin's *Visitor*, nor Mr. Harvill's *Messenger* has appeared during 1893.

*The Mathematical Magazine*, Artemas Martin, LL. D., Editor, Washington, D. C.

Only one number of this valuable periodical (March, 1893) has appeared during 1893. It contains "A table of the square roots of the prime numbers of the form  $4m + 1$  less 10000, expanded as periodic continued fractions," by C. A. Roberts, with introduction by Dr. Martin, which occupies 16 pages. Five problems are solved and eight new ones proposed. The last pages contain "Editorial Notes," and "Periodicals Received."

*The School Visitor*, John S. Royer, Editor, Versailles, Ohio.

Friend Royer maintains the interest of the department of "Practical Mathematics." Thirteen interesting problems in elementary Mathematics are solved and seven new problems are proposed in the November Number.